I claim:

1. An apparatus for diagnosing a chemical detection system comprising:

a sample retrieval device for collecting and detecting emissions, wherein the sample retrieval device includes an accumulator chamber having a sample port for receiving the emission from an emission source, a chemical sensor located within the accumulator chamber for detecting the emission, and an exhaust port for exhausting the detected emission; and

a control module containing a first operational mode to control the sample retrieval device and a second operational mode to perform a diagnostic routine to validate the performance of the sample retrieval device.

2. The apparatus of claim 1, wherein the second operational mode acquires response data from the chemical sensor through controlled exposure to a plurality of emission concentrations.

3. The apparatus of claim 1, wherein the diagnostic routine includes determining the presence of flow within the sample retrieval device.

4. The apparatus of claim 1, wherein the diagnostic routine includes measuring the absolute frequency shift of the chemical sensor.

5. The apparatus of claim 1, wherein the diagnostic routine includes acquiring response data from the chemical sensor and quantifying the noise within the response data.

6. The apparatus of claim 1, wherein the diagnostic routine includes performing controlled exposures on the chemical sensor to determine the presence of an emission concentration capable of permanently changing the chemical sensor.

7. A method for verifying the operation of a chemical detection system, the method comprising the steps of:

performing diagnostic routines on the chemical detection system, the diagnostic routines comprising controlling the exposure of a chemical sensor and taking measurements of surrounding environmental conditions;

measuring the response of a chemical sensor to the controlled exposure and the surrounding environmental conditions;

storing response data in a memory device; and

generating diagnostic data from the response data.

8. The method of claim 7, wherein the diagnostic routine includes confirming the flow of an emission and confirming the flow of an atmosphere that does not contain an emission within the sample retrieval device.

9. The method of claim 8, wherein the diagnostic routine includes computing a transient flow sensitivity response by calculating the absolute value of the arithmetic difference of a first average chemical sensor response and a second average chemical sensor response, the first average chemical sensor response computed under static flow conditions without exposure to an emission, the second average chemical sensor response computed under dynamic flow conditions without exposure to an emission.

10. The method of claim 7, wherein the diagnostic routine includes quantifying the chemical sensor saturation potential.

11. The method of claim 10, wherein the diagnostic routine further includes computing a sensor response gradient, the sensor response gradient being calculated by a ratio of a sensor response threshold arithmetically divided by a predetermined time interval, wherein the sensor response threshold is determined by performing the absolute value of the arithmetic difference of a first average chemical sensor response and a second average chemical sensor response, the first average chemical sensor response computed under static flow conditions without exposure to an emission, the second average chemical sensor response computed value under static flow conditions with exposure to an emission.

12. The method of claim 7, wherein measuring the response of the chemical sensor to the controlled exposure is comprised of quantifying chemical sensor noise.

13. The method of claim 12, wherein quantifying chemical sensor noise is accomplished by comparing an absolute arithmetic difference to at least one noise threshold value, the noise threshold value providing a graduated fault condition.

14. The method of claim 13, wherein comparing the absolute arithmetic difference is performed by computing calculating the absolute value of the arithmetic difference between an average chemical sensor response and the noise threshold value stored in memory, the average chemical sensor response computed under static flow conditions without exposure to an emission.

15. A method for verifying the operation of a chemical sensor, the method comprising the steps of:

performing diagnostic routines on the chemical sensor, the diagnostic routines comprising controlling the exposure of the chemical sensor to emissions and taking measurements of surrounding environmental conditions;

measuring the response of a chemical sensor to the controlled exposure;

storing response data in a memory device; and

generating diagnostic data from the response data.

16. The method of claim 15, wherein measuring the response of the chemical sensor to the controlled exposure is comprised of measuring an ambient temperature and an absolute frequency shift of the chemical sensor.

17. The method of claim 16, wherein the absolute frequency shift measurement is performed by computing the arithmetic difference between an average chemical sensor response and a configuration sensor response stored in the memory device, the average chemical sensor response computed under static flow conditions without exposure to the emission, wherein the configuration sensor response value is computed under static flow conditions prior to exposure to the emission.

18. The method of claim 17, wherein the configuration sensor response is measured at a discrete temperature, the discrete temperature in a range between -10 Celsius and +50 Celsius with 1 Celsius resolution.

19. The method of claim 15, wherein measuring the response of the chemical sensor to the controlled exposure is comprised of quantifying chemical sensor noise.

20. The method of claim 19, wherein quantifying chemical sensor noise is accomplished by comparing an absolute arithmetic difference to at least one noise threshold value, the noise threshold value providing a graduated fault condition.

21. The method of claim 20, wherein comparing the absolute arithmetic difference is performed by calculating the absolute value of the arithmetic difference between an average chemical sensor response and a noise threshold value stored in memory, the average chemical sensor response computed under static flow conditions without exposure to an emission, the configuration sensor response computed value under static flow conditions prior to exposure to an emission.